Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

to note that in the process of counting, we do not begin with 0. There never was a year 0. In dating our letters, we make clear this point. Suppose that on the second day after the Christian Era, a letter had been dated ; using our present conventions, the letter would have been dated January 2, 1; and this would mean 2 days of year one. So December 30, 1, would mean 364 days of year 1 ; and not until midnight of December 31, was the year 1 completed. As with the year, so with the century. December 30, 99, means 364 days, or $\frac{364}{365}$ of the 99th year, or 98 years$+\frac{364}{365}$ of 1 year; December 27, 1899, means 361 days of the 1899th year since the Christian Era, or 1898 years+361 days or 1898 years$+\frac{361}{365}$ of 1 year, or the 361st day of the 99th year of the 19th century.

B. F. FINKEL.

ALGEBRA.

95. Proposed by SYLVESTER ROBINS, North Branch Depot, N. J.

Substitute *numbers* in place of the letters in the following pattern: $\triangle=\sqrt{(81^2a^2b^2c^2)}=81abc\ldots\ldots b^2+c^2,\ a^2+c^2,\ a^2+b^2$; and compute the areas and sides of the whole nest of integral, rational triangles.

Solution by M. A. GRUBER, A. M., War Department, Washington, D. C.

Sides of general triangle are a^2+b^2, a^2+c^2, and b^2+c^2.

Whence $\triangle=\sqrt{[(a^2+b^2+c^2)a^2b^2c^2]}$.

$\therefore\ 81^2=a^2+b^2+c^2=$the sum of three squares.

When $(3^n)^2=$the sum of three integral squares, I have found that $\frac{3^n+2n-1}{4}=$the *number of sets* of three squares, of which $\frac{3^{n-1}+1}{2}$ are prime sets and $\frac{3^{n-1}+2n-3}{4}$ are multiple sets.

But $81^2=(3^4)^2$; whence $\frac{3^n+2n-1}{4}=22$.

$\therefore$ There are 22 sets of three integral squares whose respective sums$=81^2$.

$\therefore$ Also, there are 22 different integral, rational triangles whose respective areas$=81abc$.

Following are the 22 sets of three integers the sum of whose squares is 81^2, $=6561$:

1, 28, 76 ; 1, 44, 68 ; 6, 21, 78 ; 6, 30, 75 ; 6, 42, 69 ; 8, 16, 79 ; 8, 49, 64 ; 9, 36, 72 ; 16, 23, 76 ; 16, 41, 68 ; 16, 47, 64; 17, 56, 56 ; 20, 44, 65 ; 20, 55, 56 ; 21, 42, 66; 23, 44, 64 ; 27, 54, 54; 28, 41, 64; 30, 30, 69 ; 32, 49, 56; 36, 36, 63; and 40, 44, 55.

From these we derive the following 22 integral, rational triangles :

(1). Sides=785 $[=1^2+28^2]$, 5777 $[=1^2+76^2]$, 6560 $[=28^2+76^2]$; area $=172368=81\times1\times28\times76$.

(2). Sides=1937, 4625, 6560 ; area=242352.

(3). Sides=477, 6120, 6525 ; area=796068.

(4). Sides=936, 5661, 6525 ; area=1093500.
(5). Sides=1800, 4797, 6525 ; area=1408428.
(6). Sides=320, 6305, 6497 ; area=819072.
(7). Sides=2465, 4160, 6497 ; area=2032128.
(8). Sides=1377, 5265, 6480 ; area=1889568.
(9). Sides=785, 6032, 6305 ; area=2265408.
(10). Sides=1937, 4880, 6305 ; area=3613248.
(11). Sides=2465, 4352, 6305 ; area=3898368.
(12). Sides=3425, 3425, 6272 ; area=4318272.
(13). Sides=2336, 4625, 6161 ; area=4633200.
(14). Sides=3425, 3536, 6161 ; area=4989600.
(15). Sides=2205, 4797, 6120 ; area=4715172.
(16). Sides=2465, 4625, 6032 ; area=5246208.
(17). Sides=3645, 3645, 5832 ; area=6377292.
(18). Sides=2465, 4880, 5777 ; area=5951232.
(19). Sides=1800, 5661, 5661 ; area=5030100.
(20). Sides=3425, 4160, 5537 ; area=7112448.
(21). Sides=2592, 5265, 5265 ; area=6613488.
(22). Sides=3536, 4625, 4961 ; area=7840800.

Also solved by *ELMER SCHUYLER*, and *CHAS. C. CROSS*.

96. Proposed by F. M. PRIEST, Mona House, St. Louis, Mo.

How many different numbers may be written with the nine digits and zero, using them singly and in groups of from one to ten digits each, and using no figure but once in each group? How many more numbers may be written by repeating the digits and zero at pleasure in each group?

Solution by G. B. M. ZERR, A. M., Ph. D., Professor of Mathematics and Science, Chester High School, Chester, Pa.; and C. B. GOULD, Colorado College, Colorado Springs, Col.

We will not regard zero as a number.

(1). ${}^nP_r$ will be used to denote the number of permutations of n things taken r at a time.

Then ${}^{10}P_1=10$. This includes zero.

$\therefore$ ${}^{10}P_1-1=9$ when taken singly.

${}^{10}P_2=90$. This includes those that have zero for the first digit, and were therefore included in the first group, *i. e.* 9 is the sama as 09.

Hence we proceed as follows:

${}^{10}P_1-1=10-1=9$, taken 1 at a time.
${}^{10}P_2-{}^9P_1=90-9=81$, taken 2 at a time.
${}^{10}P_3-{}^9P_2=720-72=648$, taken 3 at a time.
${}^{10}P_4-{}^9P_3=5040-504=4536$, taken 4 at a time.
${}^{10}P_5-{}^9P_4=30240-3024=27216$, taken 5 at a time.
${}^{10}P_6-{}^9P_5=151200-15120=136080$, taken 6 at a time.
${}^{10}P_7-{}^9P_6=604800-60480=544320$, taken 7 at a time.
${}^{10}P_8-{}^9P_7=1814400-181440=1632960$, taken 8 at a time.